

NASA TECH BRIEF

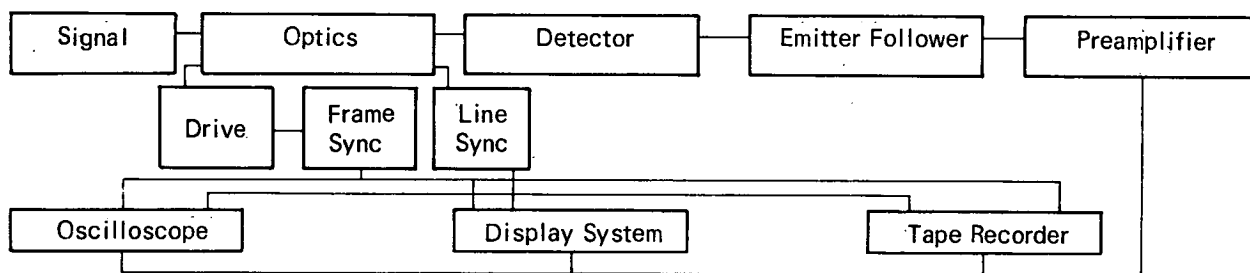


NASA Tech Briefs announce new technology derived from the U.S. space program. They are issued to encourage commercial application. Tech Briefs are available on a subscription basis from the National Technical Information Service, Springfield, Virginia 22151. Requests for individual copies or questions relating to the Tech Brief program may be directed to the Technology Utilization Office, NASA, Code KT, Washington, D.C. 20546.

Design and Development of a Fast Scan Infrared Detection and Measurement Instrument

A fast scan infrared microscope instrument measures and plots the infrared profile of semiconductor chips, transistors and integrated circuits. Infrared profile analyses yield important information on electrical and physical properties, enabling manufacturing

field of infrared microscopy, has been used in the performance of such functions as device evaluation, manufacturing process control, chip-to-header bond quality evaluation, second breakdown prediction, and failure detection and isolation.



Block Diagram of Fast Scan Infrared Microscope System

improvements in semiconductor performance and reliability.

The main sections of the instrument, shown in the block diagram, are the optics, the signal detector and amplifier, the scan mechanism, and the data storage and display subsystems. Operational performance can be described by the following requirements, as outlined in the original design specifications: (1) area of resolution is less than 10 microns; (2) thermal gradients of 274°K (1°C) at an ambient temperature of 298°K (25°C) can be detected; (3) target scan speeds range from 1 frame per minute to 10 frames per second; (4) scan area is 1 mm² with a raster pattern of 100 lines; (5) detector response is less than 1 μsec, and spectral sensitivity is from 2 to 15 microns; (6) magnet tape storage capability exists; and (7) optical system views devices as large as 2.54 × 2.54 cm (1.0 × 1.0 inches). The instrument, believed to be the most advanced in the

Note:

Requests for further information may be directed to:

Technology Utilization Officer
Marshall Space Flight Center
Code A&TS-TU
Huntsville, Alabama 35812
Reference: TSP71-10022

Patent status:

No patent action is contemplated by NASA.

Source: R. Vanzetti and A. S. Dostoomian of
Ratheon Co.,
under contract to
Marshall Space Flight Center, and
L. Hamiter and M. Nowakowski
Marshall Space Flight Center
(MFS-20749)

Category 03